

CLAIMS:

1. A method of treating a waste material having or containing at least one useful or reusable component so as to recover the useful or useable component from the remaining components of the waste material, including the steps of at least introducing the waste material into a first treatment stage to at least remove a relatively more volatile component from the waste material by forming at least two portions in which one of the portions is a partially refined portion containing the useful component, and the other portion contains the relatively volatile component, conveying the at least partially refined portion to a second treatment stage to further refine the partially refined portion into at least two further portions, wherein one of the further portions includes the useful component and the other of the further portions includes the relatively more volatile component, thereby further refining the partially refined portion into a substantially refined portion and collecting the substantially refined portion containing the at least one useful or useable component, wherein at least one of the portions containing the relatively more volatile component that is substantially or partially free of the useful component can be used, recycled or further processed to improve the efficiency or economics of the refining process for the useful or useable component or the use of the waste material.
2. A method of treating a waste material having or containing at least one useful or reusable component and a relatively more volatile component so as to recover the useful or useable component from the waste material by removing the relatively more volatile component, including the steps of:
 - at least introducing the waste material into a first treatment stage to at least partially remove the

- 23 -

relatively more volatile component from the waste material by forming at least two portions in which one of the portions is a partially refined portion containing the useful component and the other portion contains the
5 relatively more volatile component;

conveying the partially refined portion to a second treatment stage to further separate the partially refined portion into at least two further portions wherein one of the further portions includes the useful component
10 and the other further portion is substantially free of the useful component so that the partially refined portion is refined into a substantially refined portion;

15 collecting the substantially refined portion, wherein the substantially refined portion is in a condition that is suitable with or without further treatment for use as an energy source.

3. A method of generating energy from a waste material, including treating the waste material to recover
20 a useful or useable component of the waste material in a condition that is suitable, optionally with further treatment, for use as an energy source, conveying the useful or useable component to an energy generating device or installation and using the useful or useable component
25 to generate energy by operating the energy generating device wherein the treatment of the waste material includes treating a waste material having or containing at least one useful or reusable component and a relatively more volatile component or unwanted component so as to
30 recover the useful or useable component from the waste material by removing the relatively more volatile or unwanted component, including the steps of:

35 at least introducing the waste material into a first treatment stage to at least partially remove the relatively more volatile component from the waste material by forming at least two portions in which one of the portions is a partially refined portion containing the

- 24 -

useful component and the other portion contains the relatively more volatile component;

conveying the partially refined portion to a second treatment stage to further separate the partially refined portion into at least two further portions wherein one of the further portions includes the useful component and the other further portion is substantially free of the useful component so that the partially refined portion is refined into a substantially refined portion;

10 collecting the substantially refined portion, wherein the substantially refined portion is in a condition that is suitable with or without further treatment for use as an energy source.

15 4. A method according to any preceding claim, characterised in that the useful or useable material is a hydrophobic material, preferably an oil or oleo material or an oil-like material, more preferably a fat, oil or grease material or solid material, including materials 20 containing such materials.

25 5. A method according to any preceding claim, in which the hydrophobic material is an oil or oleo material or an oil-like material and the relatively more volatile component or unwanted component is water, water vapor, steam or the like.

30 6. A method according to any preceding claim, characterised in that the waste material contains up to about 20%, preferably up to about 30%, more preferably up to about 40%, and most preferably up to about 50% of fats, oils, greases and the like.

35 7. A method according to any preceding claim, characterised in that the waste material includes up to about 5%, preferably up to about 4%, more preferably about 2% of suspended solids.

8. A method according to any preceding claim, characterised in that the waste material includes from about up to 80% or more, preferably up to about 60%, more preferably about 58% and most preferably up to 50% of water.

9. A method according to any preceding claim, characterised in that the first treatment stage is a separation stage involving the use of a separation device for removing water, preferably in the form of steam from the aqueous waste material to partially refine the waste material by forming the at least two portions in which one portion is the partially refined portion having the useful component and the other portion contains water, preferably in the form of steam.

10. A method according to any preceding claim, characterised in that the separation stage includes a separation apparatus or device.

11. A method according to any preceding claim, characterised in that the separation device is a cyclonic evaporator.

12. A method according to any preceding claim, characterised in that the second treatment stage is a second separation stage using a separation apparatus, preferably a cyclonic evaporator, in which the partially refined portion from the first treatment stage is further refined into a substantially refined portion containing the useful component by substantially removing further water, in the form of steam, from the partially refined portion.

13. A method according to any preceding claim, characterised in that the oil or oil-like material is

- 26 -

combustible so as to be suitable for use as a fuel or as a component of a fuel or is treatable to form a fuel or as a component of a fuel.

5 14. A method according to any preceding claim, characterised in that the waste material is at least partially dewatered prior to introduction into the first treatment stage.

10 15. A method according to any preceding claim, characterised in that the engine using the fuel or fuel component is an internal combustion engine, a compression engine, a hydrogen assisted combustion engine or the like.

15 16. A method according to any preceding claim, characterised in that the engine is used to generate electricity, heat or power.

20 17. A method according to any preceding claim, characterised in that the waste material is obtained from manufacturing processes, including food and beverage manufacturing processes, food preparation processes, including restaurant and fast food preparation establishments, and the like.

25 18. A method according to any preceding claim, characterised in that there is a first auxiliary or secondary separation stage for treating the partially refined portion to remove further water from the portion containing the useful component, preferably in the form of steam.

30 19. A method according to any preceding claim, characterised in that there is a second auxiliary or secondary separation stage for treating the substantially refined portion to remove further water, preferably in the form of steam from the portion containing the useful

component.

20. A method according to any preceding claim, characterised in that at least one, preferably more, more preferably all, of the portions containing water and/or vapor is/are returned to the process for further use in the method in order to conserve energy.
- 10 21. An apparatus for carrying out the method of any preceding claim including one or more separators.
- 15 22. A combined waste material treatment installation and energy production facility in which the product of the waste treatment installation is used to fuel the energy production facility wherein the fuel is produced by the method of any preceding claim.
- 20 23. A method of treating a waste material, substantially as hereinbefore described with reference to the accompanying drawings.
- 25 24. An apparatus for carrying out the method of treating a waste material, substantially as hereinbefore described with reference to the accompanying drawings.
25. A combined facility, substantially as herein described with reference to the accompanying drawings.